IN THE CLAIMS

Claims 1-3, 5, 6, 16 and 19 are canceled in this amendment. Claims 4, 9, 12, 14, 15, and 20 are amended. Claims 25-41 are added. The following is a claim listing showing the claim status.

1-3. (canceled)

4. (currently amended) A method of conducting a catalyzed chemical reaction, comprising:

passing at least one reactant into ~~a~~ an engineered catalyst ~~of claim 2;~~ wherein the catalyst comprises a support material having through-porosity; a layer comprising carbon nanotubes on the support material; and a surface-exposed catalyst composition; and wherein the support material has an average pore size, as measured by microscopy, of at least 1 micrometer (μm); and

reacting the at least one reactant within the catalyst to form a product.

5. (canceled)

6. (canceled)

7. (canceled)

8. (canceled)

9. (currently amended) A method of converting a chemical reactant, comprising:

passing at least one reactant into a reaction chamber;

wherein ~~the catalyst of claim 1~~ an engineered catalyst is disposed within the reaction chamber;

wherein the engineered catalyst comprises a support material having through-porosity; a layer comprising carbon nanotubes on the support material; and a surface-exposed catalyst composition; and

reacting the at least one reactant in the a reaction chamber to produce at least one product.

10. (original) The method of claim 9 wherein the reaction chamber has an interior with a cross-sectional area and the engineered catalyst occupies at least 80% of said cross-sectional area.

11. (original) The method of claim 10 wherein the reaction chamber is a microchannel and the engineered catalyst comprises a monolith.

12. (currently amended) The method of claim 9 wherein the reaction chamber comprises an array of microchannels wherein each of the microchannels in said array comprises ~~an~~ the engineered catalyst~~ of claim 1~~.

13. (previously presented) The method of claim 12 wherein the array of microchannels is in thermal contact with at least one microchannel heat exchanger.

14. (currently amended) The method of claim 9 ~~catalyst of claim 1~~, wherein the engineered catalyst has a volume of at least 5 mm^3.

15. (currently amended) The method of claim 9 ~~catalyst of claim 1 containing~~ wherein the catalyst contains 0.1 to 20 weight %

carbon.

16. (canceled)

17. (canceled)

18. (canceled)

19. (canceled)

20. (currently amended) A method of converting a chemical reactant, comprising:

passing at least one reactant into a reaction chamber;

wherein ~~the~~ an engineered catalyst ~~of claim 5~~ is disposed within the reaction chamber, wherein the engineered catalyst comprises:

a support, carbon nanotubes disposed over said support, an oxide layer disposed over the nanotubes, and a catalyst composition disposed over the oxide layer; and

reacting the at least one reactant in the a reaction chamber to produce at least one product.

21. (original) The method of claim 20 wherein the at least one reactant is in liquid solution.

22. (previously presented) The process of claim 4 wherein the gaseous composition contacts the catalyst for 250 ms or less.

23. (previously presented) The process of claim 4 wherein the support comprises a honeycomb, foam or felt.

24. (previously presented) The method of claim 20 wherein the support comprises a honeycomb, foam or felt.

25. (new) The method of claim 4 wherein the support material is a metal.

26. (new) The method of claim 9 wherein the support material comprises cordierite, silica, alumina, rutile, mullite, zirconia, silicon carbide, aluminosilicate, stabilized zirconia, steel or alumina-zirconia blend.

27. (new) The method of claim 4 wherein at least 80% of the carbon in the catalyst is in the form of carbon nanotubes having a length of 5 to 200 μm.

28. (new) The method of claim 4 wherein the carbon nanotubes comprise clumps of aligned carbon nanotubes.

29. (new) The method of claim 20 wherein the carbon nanotubes comprise clumps of aligned carbon nanotubes.

30. (new) The method of claim 12 wherein the method of converting a chemical reactant, comprises a reaction selected from the group consisting of: acetylation, addition reactions, alkylation, dealkylation, hydrodealkylation, reductive alkylation, amination, aromatization, arylation, carbonylation, decarbonylation, reductive carbonylation, carboxylation, reductive carboxylation, reductive coupling, condensation, cracking, hydrocracking, cyclization, cyclooligomerization, dehalogenation, dimerization, epoxidation, esterification, exchange, halogenation, hydrohalogenation, homologation,

hydration, dehydration, hydrogenation, dehydrogenation, hydrocarboxylation, hydroformylation, hydrogenolysis, hydrometallation, hydrosilation, hydrolysis, hydrotreating, hydrodesulferization/hydrodenitrogenation (HDS/HDN), isomerization, methanol synthesis, methylation, demethylation, metathesis, nitration, partial oxidation, polymerization, reduction, steam and carbon dioxide reforming, sulfonation, telomerization, transesterification, trimerization, water gas shift (WGS), and reverse water gas shift (RWGS).

31. (new) The method of claim 20 wherein the method of converting a chemical reactant, comprises a reaction selected from the group consisting of: acetylation, addition reactions, alkylation, dealkylation, hydrodealkylation, reductive alkylation, amination, aromatization, arylation, carbonylation, decarbonylation, reductive carbonylation, carboxylation, reductive carboxylation, reductive coupling, condensation, cracking, hydrocracking, cyclization, cyclooligomerization, dehalogenation, dimerization, epoxidation, esterification, exchange, halogenation, hydrohalogenation, homologation, hydration, dehydration, hydrogenation, dehydrogenation, hydrocarboxylation, hydroformylation, hydrogenolysis, hydrometallation, hydrosilation, hydrolysis, hydrotreating, hydrodesulferization/hydrodenitrogenation (HDS/HDN), isomerization, methanol synthesis, methylation, demethylation, metathesis, nitration, partial oxidation, polymerization, reduction, steam and carbon dioxide reforming, sulfonation, telomerization, transesterification, trimerization, water gas shift (WGS), and reverse water gas shift (RWGS).

32. (new) The method of claim 4 wherein a mesoporous thin

silica film is disposed between the support and the layer of nanotubes.

33. (new) The method of claim 9 wherein the engineered catalyst comprises an oxide layer disposed between the support and the layer of carbon nanotubes.

34. (new) The method of claim 20 wherein the engineered catalyst comprises an oxide layer disposed between the support and the carbon nanotubes.

35. (new) The method of claim 10 wherein the catalyst has a pore volume of 30 to 95%, and at least 50% of the catalyst's pore volume is comprised of pores in the size range of 0.3 to 200 microns.

36. (new) The method of claim 20 wherein the reaction chamber has an interior with a cross-sectional area and the engineered catalyst occupies at least 80% of said cross-sectional area.

37. (new) The method of claim 9, comprising:

passing the at least one reactant into at least 10 reaction chambers in an integrated chemical reactor;

wherein the at least 10 reaction chambers comprise the engineered catalyst.

38. (new) The method of claim 37 wherein the integrated chemical reactor further comprises microchannel heat exchangers.

39. (new) The method of claim 37 wherein the at least 10 reaction chambers are connected in parallel and wherein each of

the at least 10 reaction chambers has a height and/or width of 2 mm or less.

40. (new) The method of claim 37 wherein the integrated chemical reactor further comprises second reaction chambers that are adjacent to the at least 10 reaction chambers such that heat from an exothermic reaction in one reaction chamber is transferred to an endothermic reaction in an adjacent reaction chamber.

41. (new) The method of claim 20, comprising:

passing the at least one reactant into at least 10 reaction chambers in an integrated chemical reactor;

wherein the at least 10 reaction chambers comprise the engineered catalyst.